

HARRIER MISSION

COMBAT & FLIGHT SIMULATOR



AMIGA — ATARI ST INSTRUCTION MANUAL

ANCO

SOFTWARE INC.
P.O. BOX 292
BURGETTSTOWN
PA 15021

LOADING

ATARI ST — Insert the HARRIER MISSION disc in the drive and switch on the computer.

AMIGA — Switch OFF the computer and switch it ON after 20 seconds or more. DO NOT load the HARRIER MISSION disc by simply RESETING the machine as the disc may get corrupted. Insert the Harrier Mission disc when the computer asks for the WORK BENCH. Amiga 1000 owners need Kick Start 1.2 to be loaded.

INTRODUCTION AND GENERAL DESCRIPTION

Jump Jet is a common name given to aircraft that do not require a runway in order to become airborne.

This computer program contains the essential elements of a mission undertaken by a Sea Harrier from the deck of an aircraft carrier and gives the user the following options:

- Taking off and Hovering over the landing pad;
- Flying a little higher, hovering over the carrier, and learning to position the aircraft over the pad in preparation for a vertical landing;
- Leaving the vicinity of the carrier to practice approaches;
- Accelerating away to track down and destroy enemy aircraft, then returning to land.

Successfully landing the Sea Harrier requires considerable skills. This aspect of the mission should be practised until it can be accomplished without using too much fuel; only then should the pilot attempt to leave the vicinity of the carrier in search of the enemy. It is comparatively easy to leave the carrier from take-off, but if the pilot is unable to approach and land, the mission will have failed and no promotion gained.

A Sea Harrier fully laden with 6600 pounds of fuel and its full complement of armaments (missiles and bombs) has to use a ski-runway at the end of the carrier to become airborne. This program has been specially modified to carry only 5000 pounds of fuel and four missiles. A hover take-off is therefore possible and adds greatly to the user's interest. All distances are given in nautical miles and speed is given in knots (nautical miles/hour).

The program has four skill levels and a practice level, any of which can be selected at the start of the program. The pilot starting as a Flight Lieutenant (Skill Level 2) progresses through the ranks of Squadron Leader and Wing Commander to Group Captain (Skill Level 5). Considerable skills are required to land a Sea Harrier in stormy conditions and mountainous seas. On Practice Level (Skill Level 1) the plane will be re-fuelled each time that you land on the pad.

Although it is impossible to incorporate every aspect of this fighter plane into a computer program with limited memory, the program does contain the features that make this aircraft unique.

FLIGHT THEORY

On a conventional jet aircraft with fixed rearward pointing jets increased thrust results in increased speed. Since lift is provided by the wings, the aircraft has to reach a certain speed to provide enough lift for it to become airborne, and once airborne the aircraft must maintain speed to avoid stalling. The plane's attitude in flight is controlled by normal wing (Ailerons) and tail (Tail Plane) adjustments.

However, the Sea Harrier has the ability to alter the angle of its jet nozzles. Only when the aircraft is flying in excess of 180 knots with the nozzles pointed rearwards will the Sea Harrier behave like a conventional jet aircraft, and react normally to speed and attitude control.

Lift is provided by pointing the nozzles down or at an angle. When the nozzles are pointing vertically down an increase in thrust results in increased height. At this stage pulling back on the joystick will cause the aircraft nose to tilt up: this will make the plane fly backwards. This characteristic is used to position the plane accurately above the landing pad when in hover mode. However, the manoeuvre described above could cause a loss of height; this should be corrected by accurate control of thrust.

When the nozzles are pointing at an angle the vertical vector of the thrust provides lift, and the horizontal vector provides forward movement. Therefore, to accelerate from hover position the thrust is set to an angle of 45 degrees. At low speeds, the normal attitude controls (Ailerons and Tail Plane) are relatively ineffective. The control valves divert a measure of thrust to small jets called "puffers", which are situated at the nose, tail, and wing tips. The puffers are controlled, as in normal flight, by the joystick; raising the nose at this stage will slow the plane, eventually causing it to fly backwards; while dipping the nose will increase the speed. The nozzles can be set rearwards when the speed has reached in excess of 180 knots. The Jet now behaves as a normal plane.

When the Sea Harrier is travelling at high speeds, the thrust can be pointed forwards to achieve rapid deceleration. When decelerating, the nozzles must first be changed to the vertical or 45° position before the air speed falls below 180 knots, in order to maintain lift and prevent stalling.

WHAT YOU CAN EXPECT TO SEE

The instrument panel will be in view throughout the program action, and at all times the action viewed through the cockpit window reflects the readings currently displayed on the instrument panel.

The initial display is a bird's-eye view of the Sea Harrier, positioned on an aircraft carrier.

As the Sea Harrier lifts off and gains height, the size of the aircraft increases, representing the increasing distance above the landing pad. Once above 50ft. the view will change to a split screen; the left showing the side view, and the right showing the rear view of the carrier. If the Sea Harrier is then positioned exactly over the pad and the height decreased to less than 30ft. the scene will revert to the opening bird's-eye perspective. However, if the Sea Harrier is flown higher than 200ft. or moves out of range of the forward and turning motion of the aircraft. When returning to the carrier using the radar navigation, the pilot can first expect to see the carrier appear on the horizon, moving closer as the aircraft approaches. Provided that the approach to the carrier is performed correctly, the scene will return to the split screen view of the carrier and plane, and subsequently to the bird's-eye view.

INSTRUMENT PANEL AND CONTROLS

1 RADAR

This is an implementation of the CRT Sweep Radar. After the pilot has left the carrier and is out at sea the radar will show the relative positions of the carrier (ship symbol) and the enemy aircraft (triangle). The vertical line on the radar scanner represents the direction of flight of the aircraft with the Sea Harrier at the centre circle. Therefore, to directly approach a target, the Jet should be turned until the desired target is directly ahead. The distance of the target from the centre dot represents the actual distance of the pilot from the enemy aircraft or carrier; the outer edge of the radar screen represents approximately 28 miles.

2 & 3 RADAR DISTANCE AND HEADING LOCK

If the key R is pressed during the flight, an aiming sight will appear on the radar which then can be controlled by the KEYBOARD. By accurately positioning the sight over the carrier or enemy aircraft and pressing the DELETE key, window 2 will display the exact distance between you and the target. The bearing of the target will also be displayed in window 3. While the Keyboard is used to control the Radar Lock, the Sea Harrier will continue to be controlled by the Mouse. You are strongly advised to take a FIX on the carrier before embarking in pursuit of the enemy. The distance and the bearing of the Carrier will continue to be displayed in windows 2 and 3 although the Carrier is outside the radar cover area. This facility is essential to locate the Carrier on the return flight.

3 BEARING

This is the angle which you must turn to head towards the target. When the bearing is zero, the target is dead ahead of you. If the bearing is 180°, you are flying away from the target.

4 & 5 ALTITUDE

The pointer represents tens, hundreds, or thousands of feet (as appropriate). The window at 5 shows the exact altitude to the nearest foot.

6 FUEL

The initial fuel load shows 5000 pounds. The fuel load does not affect your speed or performance, in any significant way.

7 TIME

This shows the length of flight. The skilled pilot will use this indicator to assist in fuel and navigational calculations.

8 HDG

This shows the compass heading of the Sea Harrier, between 0 and 360 degrees. This heading will change if the aircraft is turned.

9 ARTIFICIAL HORIZON

This shows the relative position, in terms of pitch and bank, of the aircraft to the outside horizon. It does not indicate height. Levels of pitch and bank are controlled by the Mouse in the normal way.

10 POWER

The throttle position shows the power selected by using + and - keys. Approximately 75% of available power is required to maintain height when hovering steadily, whilst full power is necessary to climb or accelerate away.

11 WARNING LIGHT

The warning light will flash, accompanied by an audio signal, if any of the following conditions exist:

- a) The fuel levels falls below 300lbs;
- b) The height is greater than 5000ft;
- c) The undercarriage is not down while the Jet is on the carrier;
- d) The flaps are not down on take-off or landing;
- e) You approach the carrier with gunsights on;
- f) Your speed is less than 180 knots and the nozzles are directed rearwards;
- g) Either the undercarriage or flaps or both are still down at a speed greater than 300 knots.

12 NUMBER OF WARNINGS ACCUMULATED PER FLIGHT

If you exceed the number of warnings allocated for each skill level you will not achieve a higher rank.

LEVEL	RANK	WARNINGS ALLOWED
1	Practice Level	—
2	Flight Lieutenant	9
3	Squadron Leader	7
4	Wing Commander	5
5	Group Captain	3

13 & 14 AIRSPEED

The pointer shows airspeed to the nearest 10 or 100 knots with the exact speed shown in window 14. Negative speed (rearward flight) are shown only in window 14.

15 MISSILES

The Number of air-to-air missiles remaining is displayed at 15. The aiming sight is selected by key M. Each flight is allowed 4 missiles.

16 VTA

This shows the angle of vertical thrust, as selected by:

- Key 1 — Rearward thrust
- Key 2 — 45 degree thrust
- Key 3 — Vertical thrust
- Key 4 — Forward thrust

17 UNDERCARRIAGE

The undercarriage position, down or up, is controlled by the key U on the keyboard. It should be up before the Jet exceeds 300 knots, to avoid adding a warning to the total. The undercarriage can be lowered when the speed is less than 300 knots.

18 FLAP POSITION

Flap position, either up or down, is selected by key F. Flaps must be down before you apply vertical thrust, to start hovering. Flaps must be up before exceeding 300 knots and down before the speed falls below 180 knots.

FLYING INSTRUCTIONS

TAKE OFF

To take off, it is necessary to select flaps down — (F), vertical thrust — (3), and increase power to maximum — (+).

HOVERING — SCENE 1

Once airborne, reducing power to $\frac{3}{4}$ of maximum will maintain height. Forward and backward movement is controlled by using the Mouse. Banking the Jet will induce sideways movement. Manoeuvring causes loss of height so more power may be required.

HOVERING OVER THE CARRIER — SCENE 2

If the height has been increased to more than 50ft. the scene through the cockpit window changes from the bird's-eye view to the split screen perspective, but control of the Sea Harrier remains the same. If the plane is not positioned exactly over the landing pad before attempting to come below 20ft., a warning will sound. The position of the landing pad is indicated by two GREEN lights on the left view and by two RED lights on the right view. If positioned correctly, the scene will change to a bird's-eye view, once below 30ft. Therefore, if you are below 30ft. and the scene has not changed, do not come any lower. Increase height and reposition the aircraft accurately over the landing pad.

LANDING

To land on the pad, manoeuvre the aircraft over the centre of the pad and reduce power (in order to reduce height). At higher skill levels, wind and rising seas will necessitate landing with speed, to give zero movement in relation to the carrier.

ACCELERATION

If the Sea Harrier is flown higher than 200ft., or manoeuvred out of range of the split screen display, the scene will change to a sea and sky environment and the radar will show the relative positions of the carrier and enemy aircraft. By selecting thrust at 45°, the aircraft may be accelerated to normal flying speed. Remember that you should not select rearward thrust until a speed of at least 180 knots is attained, and that you should raise the undercarriage and flaps before exceeding 300 knots to avoid gaining warnings.

FLIGHT OVER THE SEA

A speed of approximately 400 knots is required to achieve economical low-level cruising. Prolonged high power settings will consume too much fuel. If you climb to 5000ft. or above, you will be exposed to enemy radar, and missile attack (and collect warnings).

ENEMY ATTACK

Select M to activate the aiming sight and arm the missile. When the enemy fighter is within 5 miles, it will come into view. At this point, you have no option but to engage the enemy. Manoeuvre your aircraft to bring the enemy fighter within the aiming sight. If you have any missiles left, LOCK the missile ON by pressing L key. The LOCK ON sign will become active if your manoeuvre has been successful. Press the HELP key or the Right Mouse Button to launch the missile. If the target is destroyed, a message to that effect will be displayed. The message board will also inform you of the enemy attack by flashing message MISSILE ALERT. The bearing of the incoming missile will be given. You must turn your fighter to face the incoming missile to enable you to view it. As the missile nears you, judge its distance carefully and anticipate its arrival at your present position. Release CHAFF by pressing the key C. The Chaff will last approx. 5 seconds and if the missile arrives at that position during that time, the missile will home on to the Chaff. You must bank and accelerate away from the Chaff rapidly to avoid the missile. Your missile may miss the enemy if he has released Chaff, if the enemy was more than 4 miles from you when the missile was fired, or the enemy outmanouvered the missile.

The enemy has 2 missiles and your armament consists of 4 missiles at the time of take off. Use them with care. However you must stop the enemy from escape and if you do not have any missiles, you can use your cannon to destroy him. Keep the enemy in sight and press the DELETE key or the LEFT Mouse Button to fire the Cannon. You need 10 direct hits to destroy the enemy. If the enemy escapes, he will destroy your Carrier and the game is OVER as you have nowhere to land. The aiming sight for the missile and cannon turns to red when the target is dead in the centre. The key L is pressed at this stage to launch a missile, the sight will pulsate to indicate that it is locked on. Similarly while the sight is red, the cannon shots fired will hit the target.

NAVIGATION

The compass is 0 to 360 degrees with 0 in 12 o'clock position and readings increasing in clockwise direction.

RETURNING TO LAND

Once the carrier has been located on the radar you must approach it until it appears on the horizon at 5 miles' distance, at which time the radar becomes ineffective and the approach is controlled visually. You must be within 2 miles, between 50 and 200ft. high, and travelling at less than 20 knots to achieve the close-up landing scene, and once again be exactly over the pad below 30ft. before the Sea Harrier is placed in the final landing scene.

SKILL LEVELS

There are five skill levels. The skill level is selected at the start of the program. Your rank is denoted by the skill level selected and successful completion of the subsequent mission. As you progress through the ranks, you must destroy a greater number of enemy aircraft and face worsening climatic conditions.

LEVEL	RANK	SEA CONDITIONS	WEATHER CONDITIONS	ENEMY AIRCRAFT
1	Practice Level	Calm	Calm	—
2	Flight Ltnt.	Calm	Calm	1
3	Squad. Leader	Slight Swell	Fresh	2
4	Wing Commander	Heavy Swell	Turbulent	3
5	Group Captain	Mountainous Seas	Stormy	4

You must successfully complete the mission to attain the selected rank. Promotion through the ranks requires increasing skills in hovering, altitude and attitude control. In particular, the effects of wind on the Sea Harrier, and sea on the carrier require considerable skills when approaching the carrier and in achieving a successful landing.

SUMMARY OF CONTROLS

	MOUSE	KEY
Bank Left	Left	
Bank Right	Right	
Nose Up	Down	
Nose Down	Up	
Fire Missile	Right Button	
Lock Missile	—	L
Fire Cannon	Left Button	DELETE
View Left	—	Z
View Right	—	X
View Front	—	S
Quit	—	ESC
Missile Sight ON/OFF	—	M
Radar Lock Sight ON/OFF	—	R
Radar Sight Controls	—	CURSOR KEYS
Radar Lock On	—	DELETE
Flaps UP/DOWN	—	F
Undercarriage UP/DOWN	—	U
Throttle UP/DOWN	—	+/-
Nozzle Controls	—	1, 2, 3 & 4
Quiet All Sounds	—	Q

Adapted and Programmed by P. McCracken and J. Stuart.

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